MC-80 image quality and SC-120 Stain protocol

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CONTENTS

Case Background

After installation of CAL8000 System , the customer complain on MC-80 image quality :

- Chromatin and Nucleus of Diff cells : The details of nucleus and chromatin not clear , The nucleus have solid dark effect stain.
- Neutrophil: Nucleus is dark and not all cells same , some cells are good and same field there is cells with very dark effect.
- Monocytes: Nucleus Should be blue to grey , the actual effect is dark.
- Eosino : The granules are dark, and the chromatin not show the details.
- Poor nuclear quality contrast, nuclear staining too dark and lack of detail, MC80 erythrocytes are satisfactory but microscopy effect is too pale.

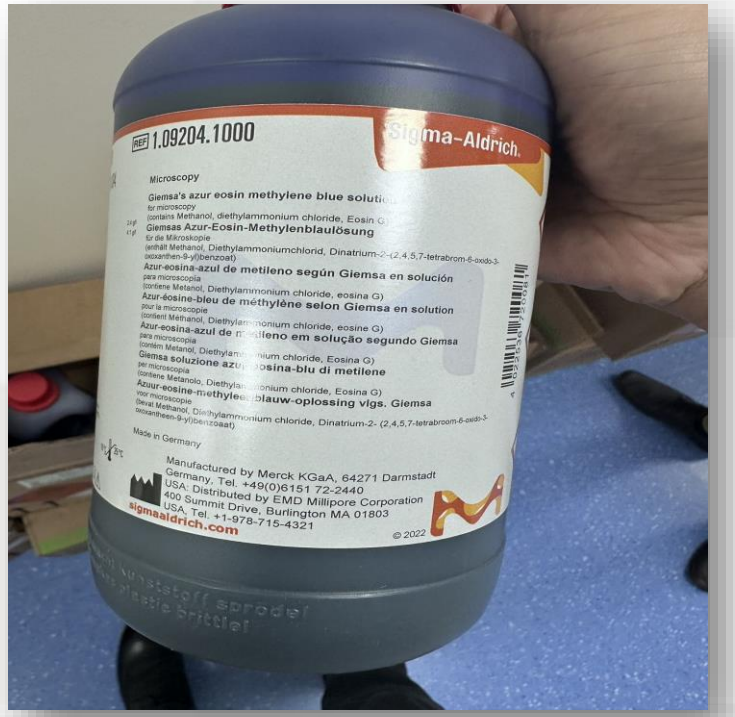
Case Background

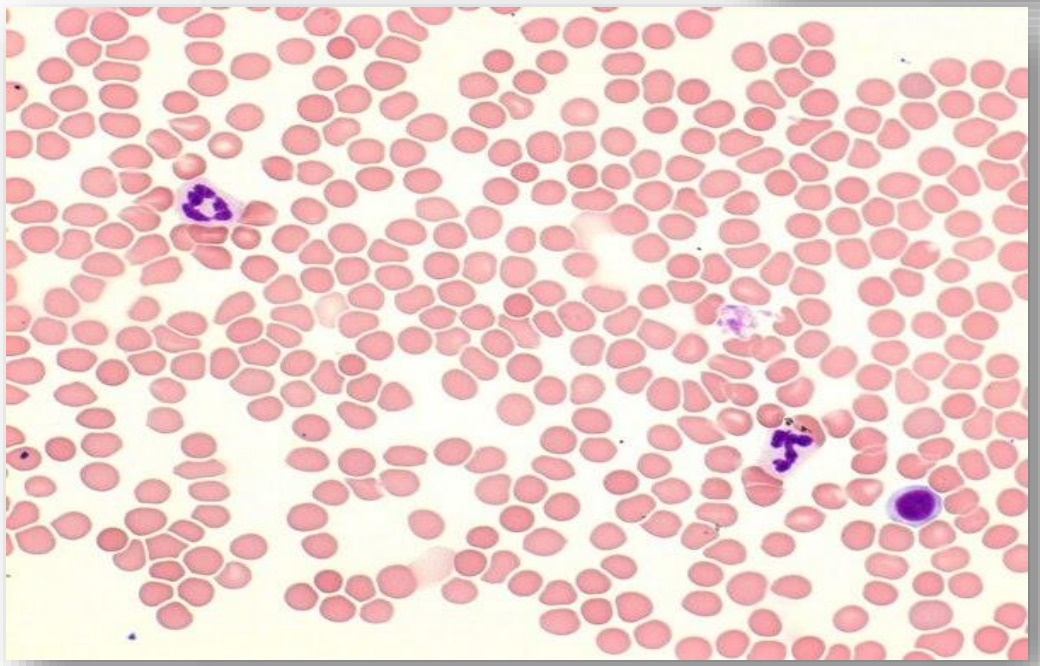
MERCK Stain :

Double stain

Giemsa eosin methylene blue :

Erythrocytes : Reddish-brownish.
Nuclei / Chromatin : Red to violet.
Eosinophilic granules : Reddish to red-brown.
Neutrophilic granules : Light violet.
Lymphocyte cytoplasm : Blue.
Monocyte cytoplasm : Grey-blue.
Basophilic granules : Dark violet.





Reference image

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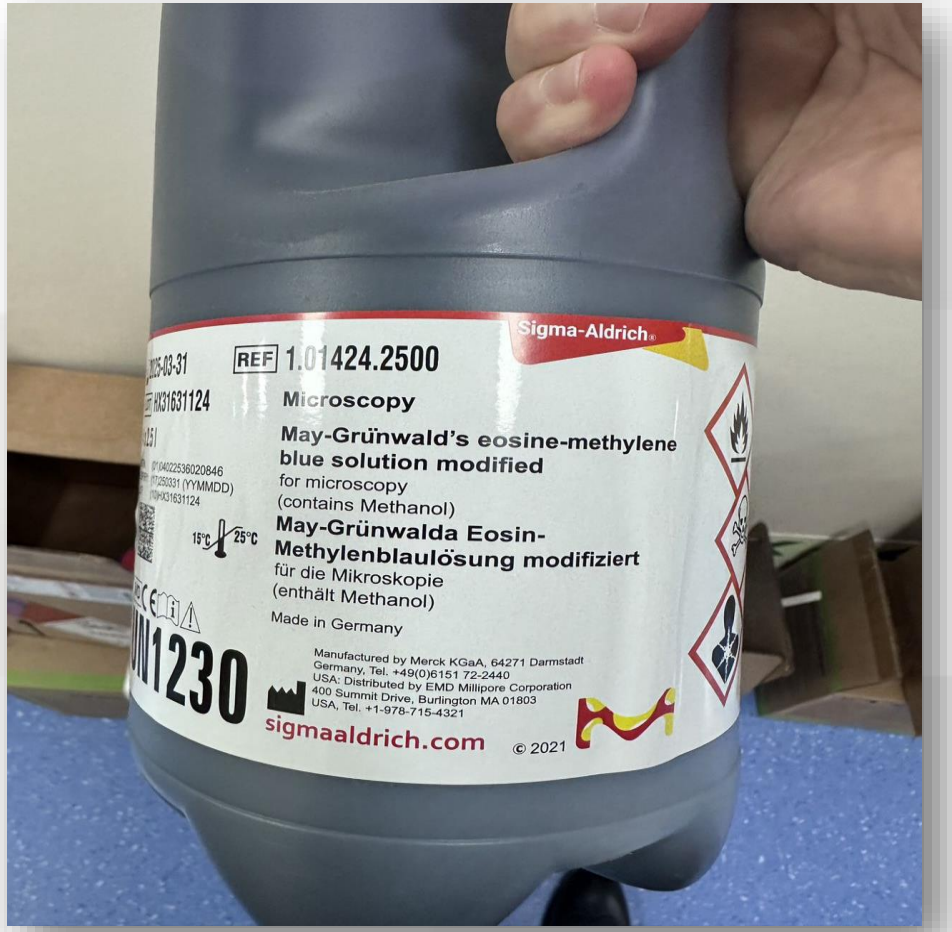
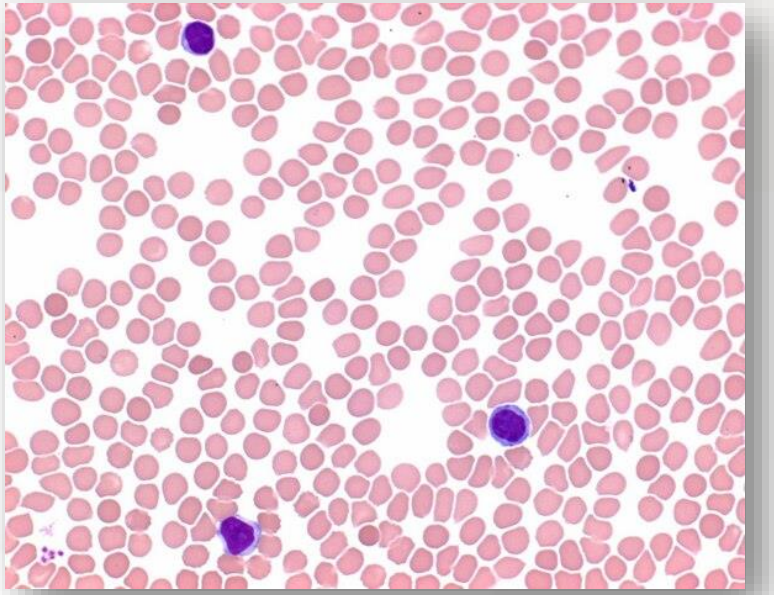
Case Background

May-Grunwald eosine-methylene

Erythrocytes : Pink to brownish
Nuclei : Violet
Eosinophilic granules : Red-brown
Neutrophilic granules : Light violet
Lymphocyte cytoplasm : Blue



Reference image

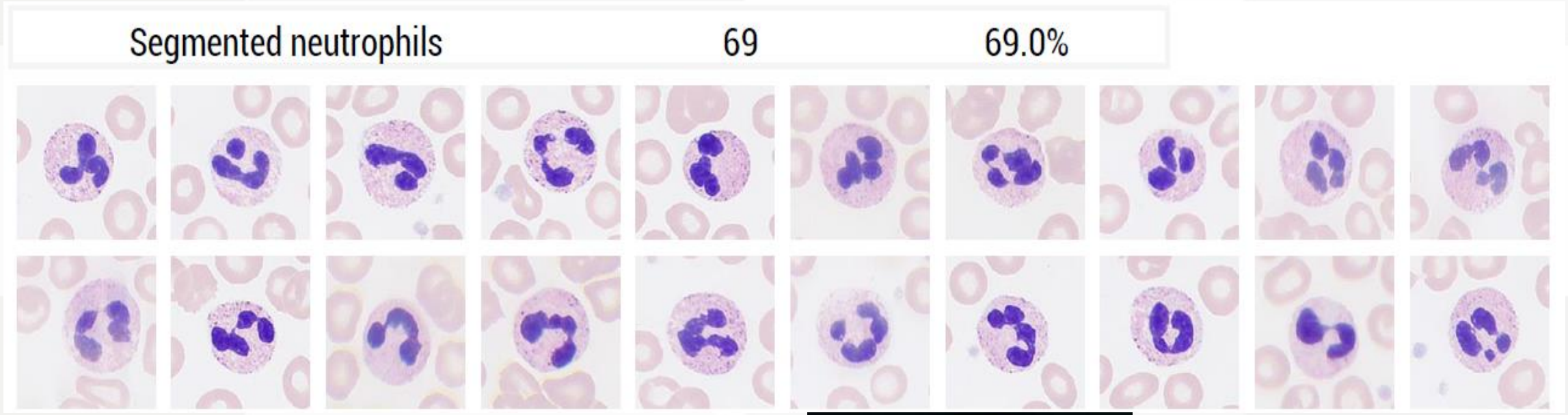


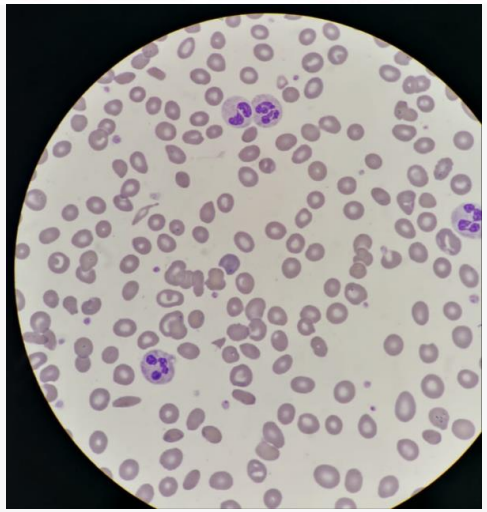
The resulting stain can vary depending on the influence of fixation, staining times, pH-value of the solutions or buffer substances

Case Background

- The details of nucleus and chromatin not clear , The nucleus like solid dark stain

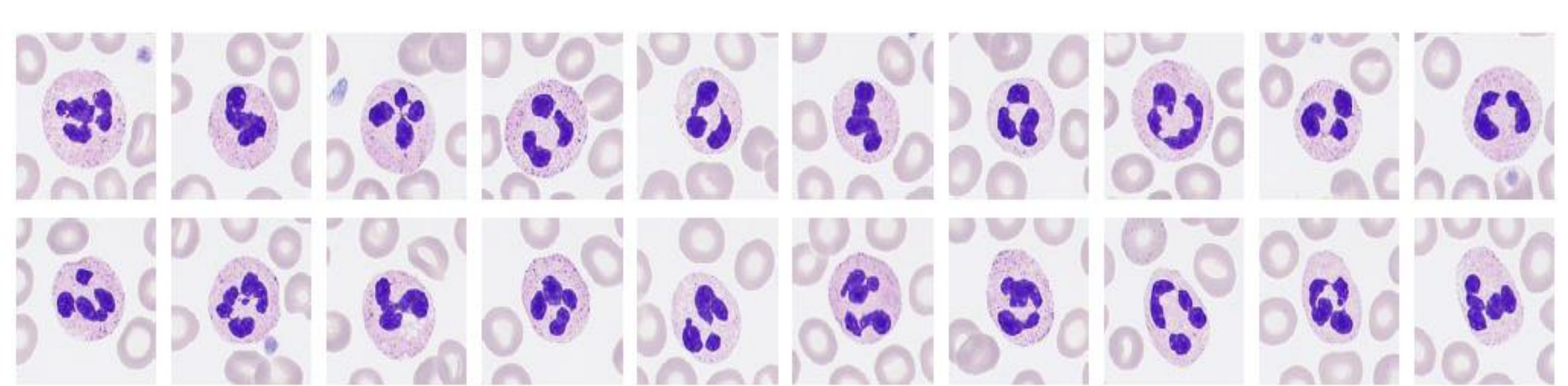
Segmented neutrophils	69	69.0%





Case Background

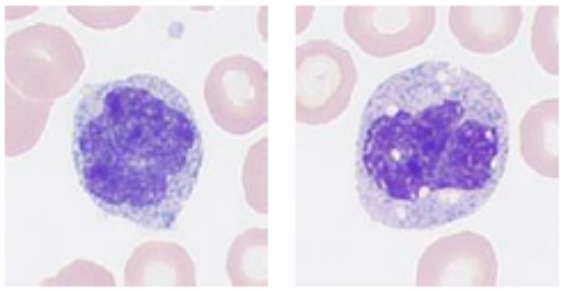
- Neutrophil: Nucleus is dark and not all cells same , some cells are good and same field there is cells with very dark



Case Background

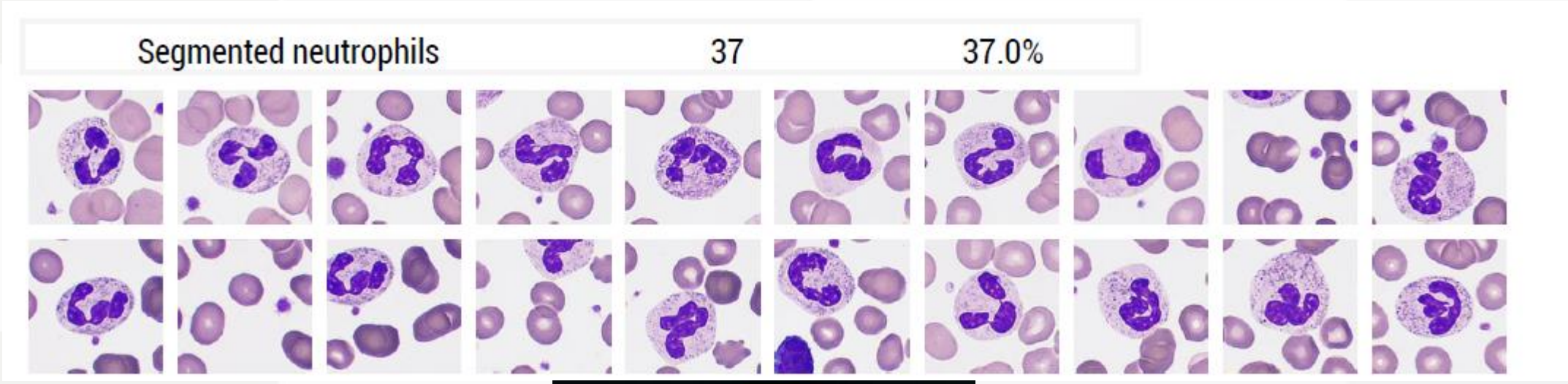
- Monocytes: Nucleus Should be blue to grey , can't distinguish the cell type easily.

Monocytes	2	2.0%

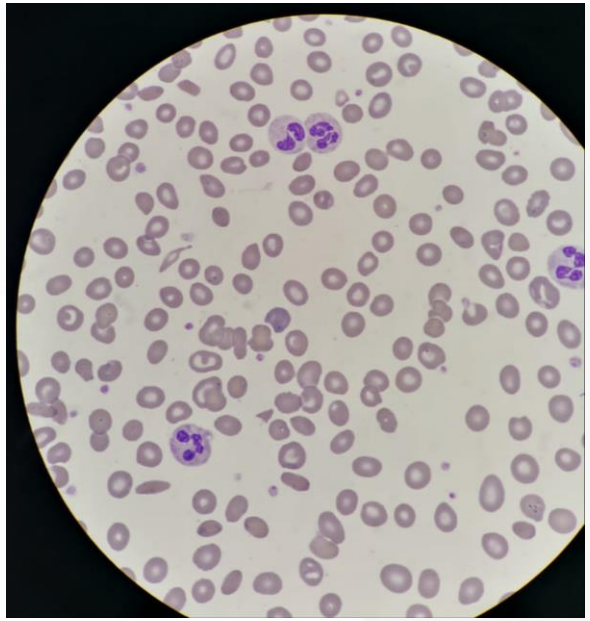


Case Idea

This slide prepared and stained manually, and read it on MC-80 . have a good performance



The issue from stain or MC-80??

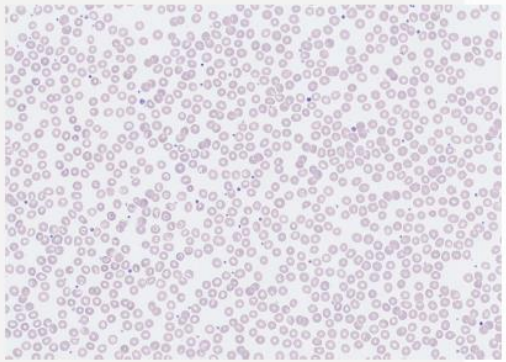


Case Idea

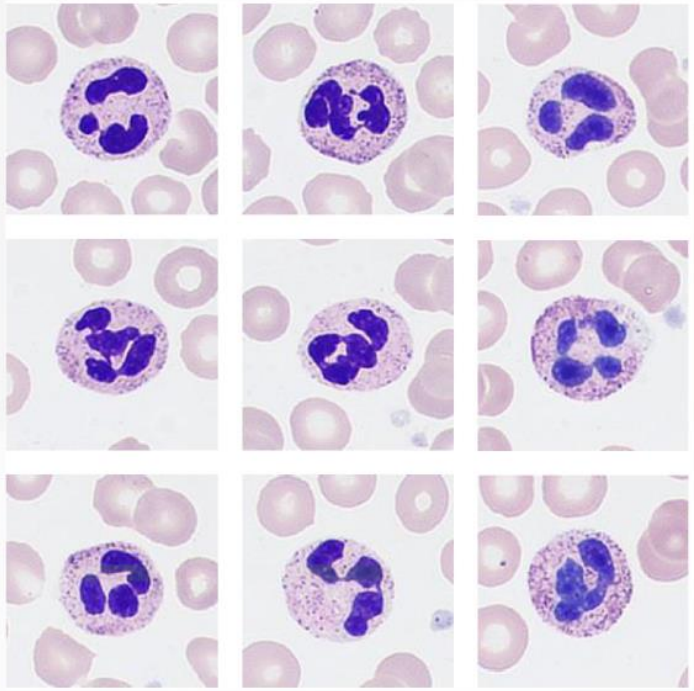
Try to use different stain protocol , check with end user to achieve the requirements.

No Methanol Prefix, 1+1/3+5,

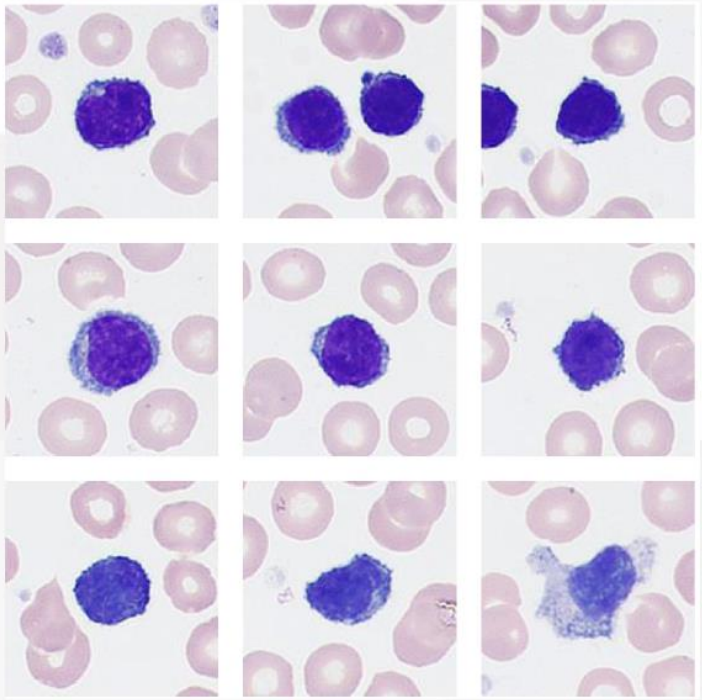
Stain Protocol
Dispense StainA:1 time
Dispense StainB:1 time
Step1:Methanol Prefix 0.0min
Step2:Stain1 3.0min
Step3:Stain2 5.0min
Step4:Wash Times 4



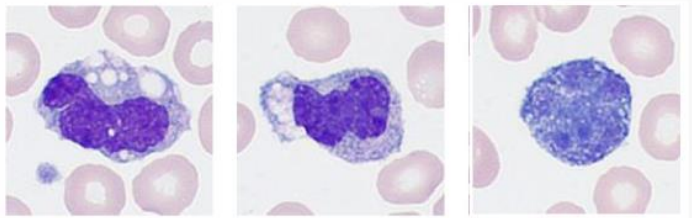
Segmented neutrophils



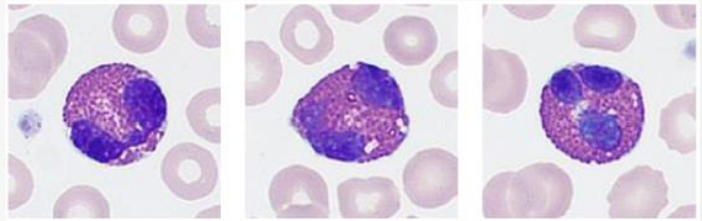
Lymphocytes



Monocytes



Eosinophils

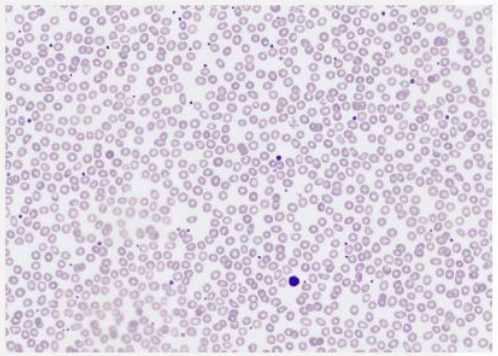


20240109131838143_1971

Case Idea

1.5min Methanol Prefix, 0+1/3+5

Stain Protocol
Dispense StainA:0 time
Dispense StainB:1 time
Step1:Methanol Prefix 0.0min
Step2:Stain1 3.0min
Step3:Stain2 5.0min
Step4:Wash Times 4



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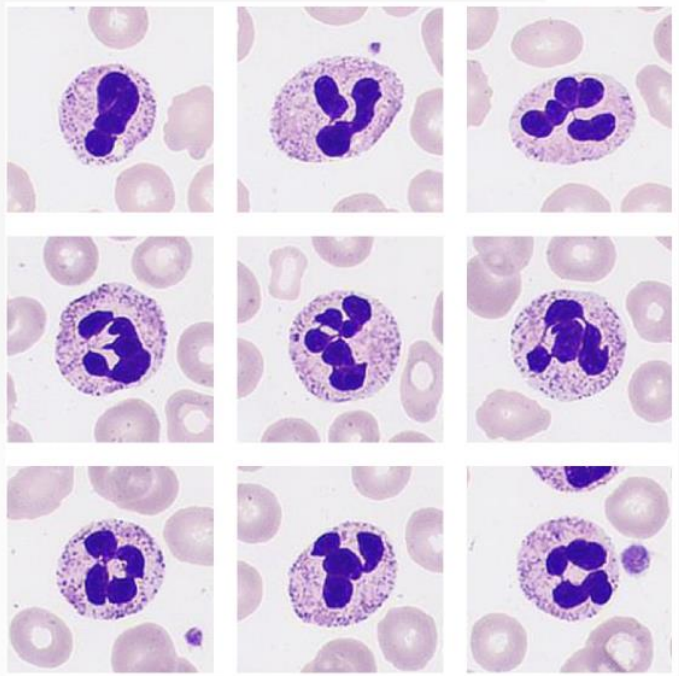
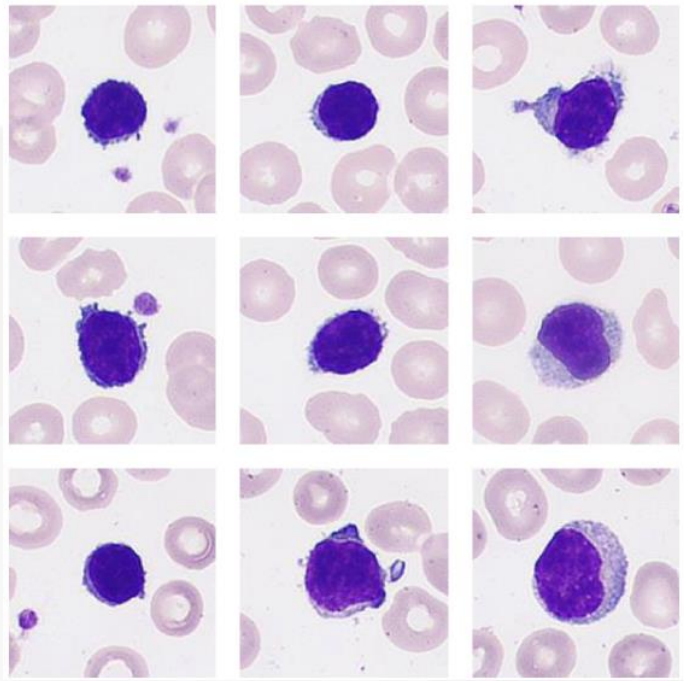
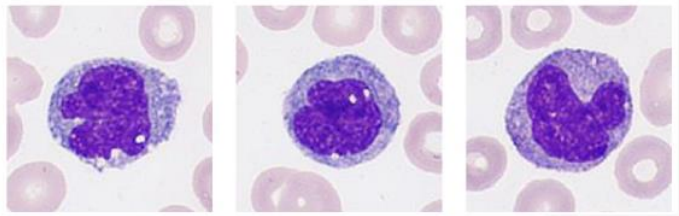


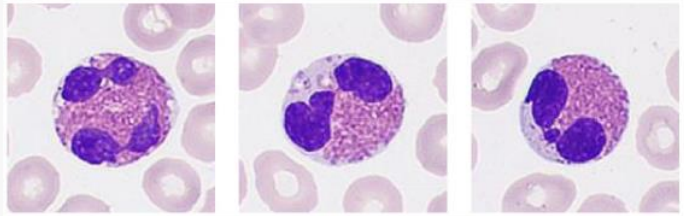
Lymphocytes



Monocytes



Eosinophils



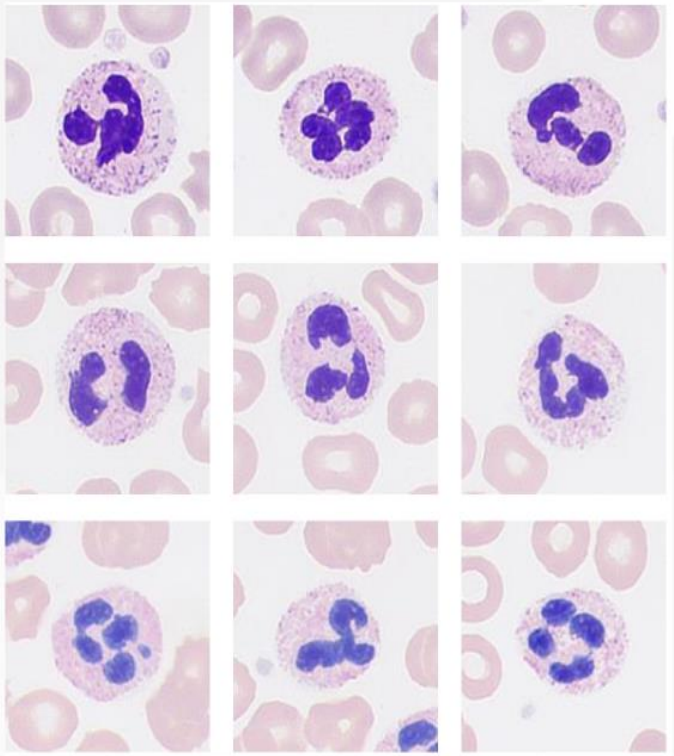
20240109153629958_1401

Case Idea

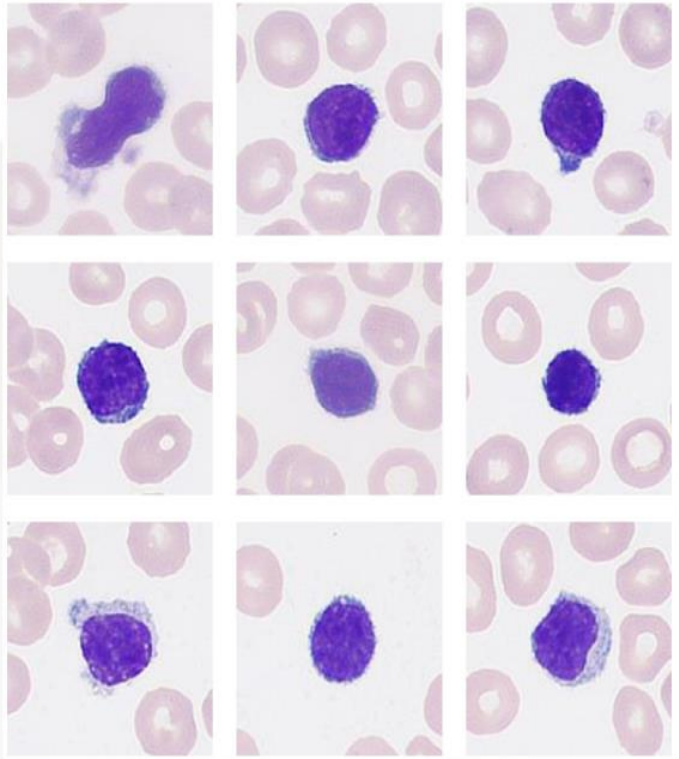
1.5min Methanol Prefix, 0+1/0.5+3

Stain Protocol
Dispense StainA:0 time
Dispense StainB:1 time
Step1:Methanol Prefix 1.5min
Step2:Stain1 0.5min
Step3:Stain2 3.0min
Step4:Wash Times 4

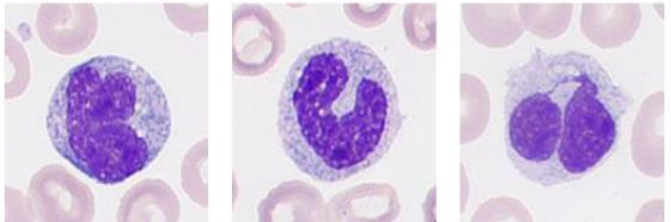
Segmented neutrophils



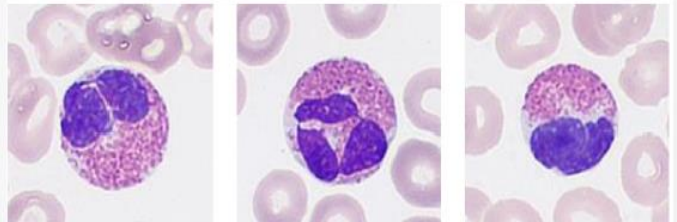
Lymphocytes



Monocytes



Eosinophils



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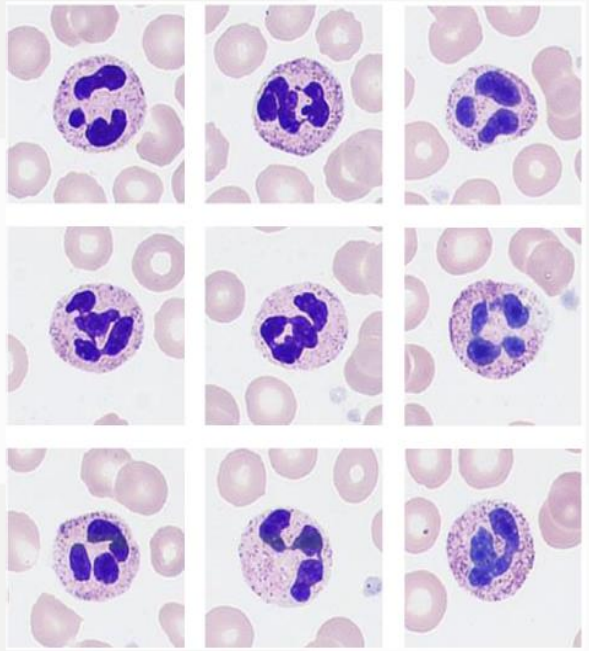
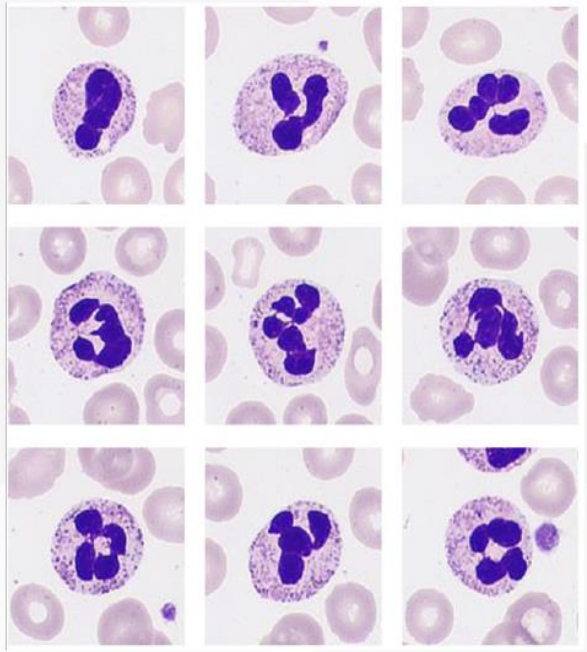
Case Idea

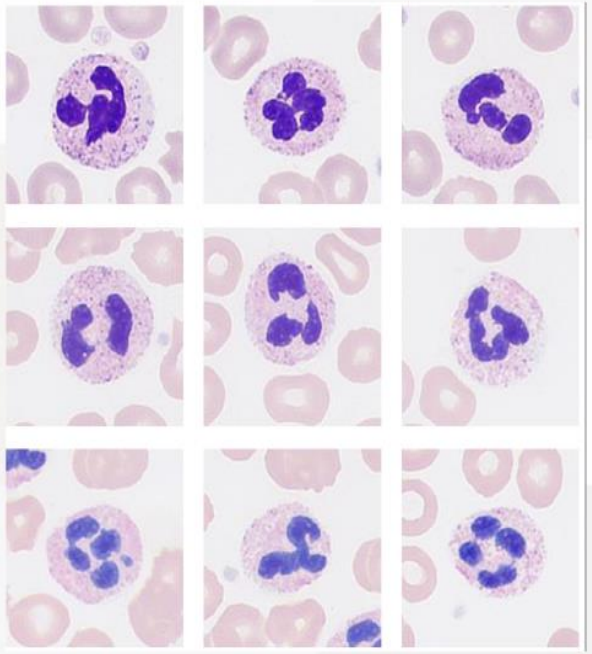
1+1/3+5



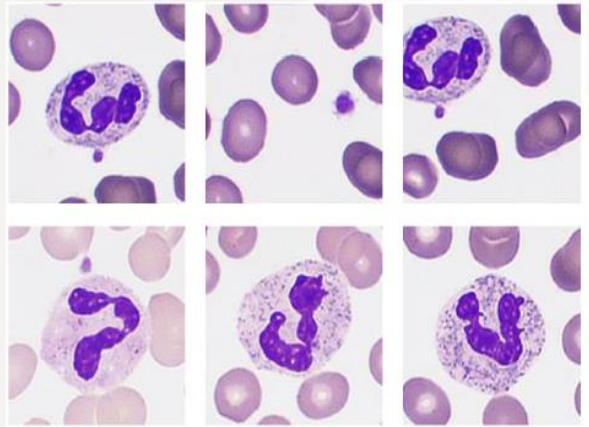
0+1/3+5



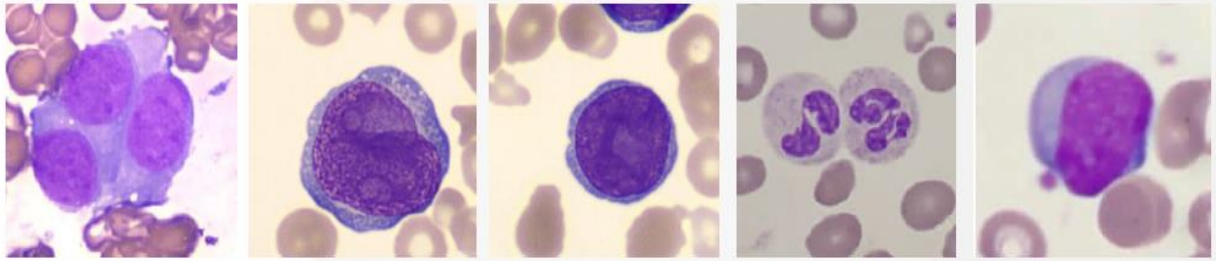
0+1/0.5+3



Manual Stain



Expecting Effect



Root Cause

Cells dying fault :

Root Cause: The minimum staining time is still producing darkly stained nuclei with low nuclear content resolution, it is due to the Merck reagent formulation and cannot be changed.

This is a characteristic issue of the staining solution and not a problem with Mindray products like SC120 or MC80.

Buffer PH changed to 6.8 , but the effect still for Monocyte is blue

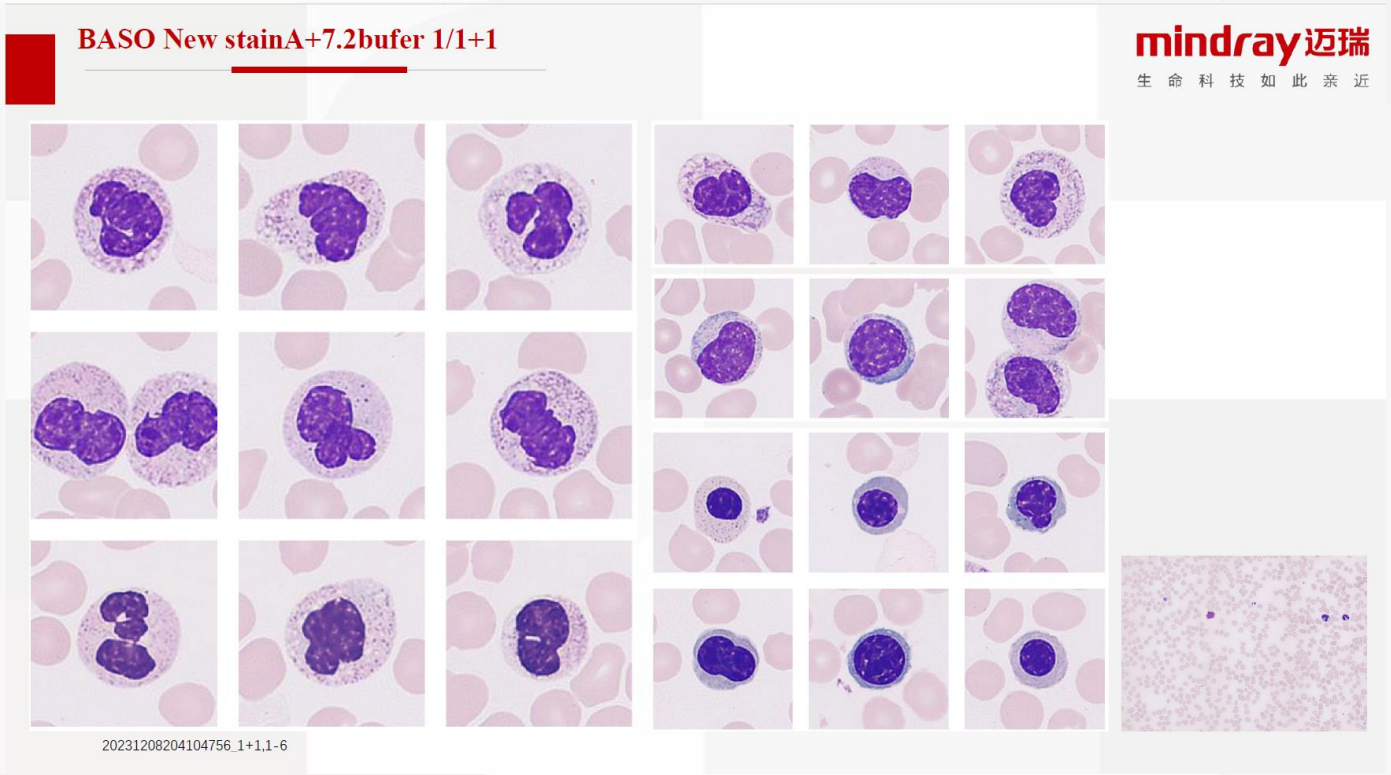
The recommendation to try other brands of reagents and Buffer PH to 6.8

Case Solution

➢ Chromatin and Nucleus of Diff cells :

By using Baso brand Stain , Single stain : Wright-Giemsa stain.

Use of several stain protocol to achieve customer requirement



Case Solution

Different stain protocol by using PH 7.2 Buffer.
The effect better than Merck but the cells look more darker than Microscope

BASO Reagent effect

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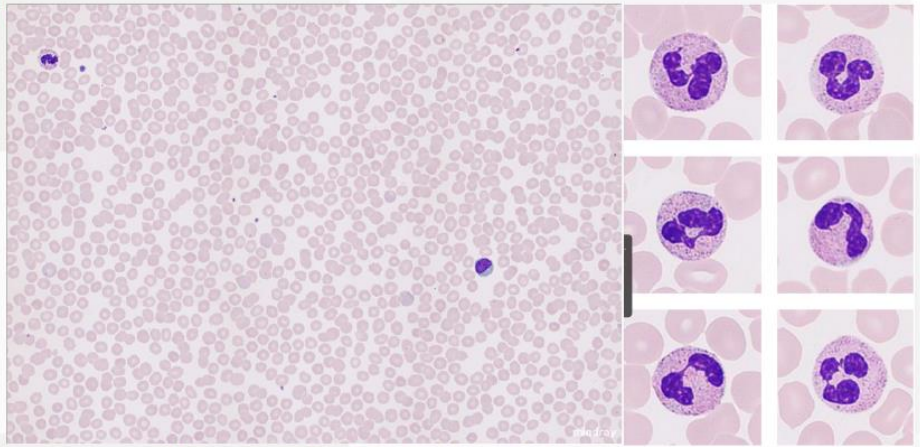
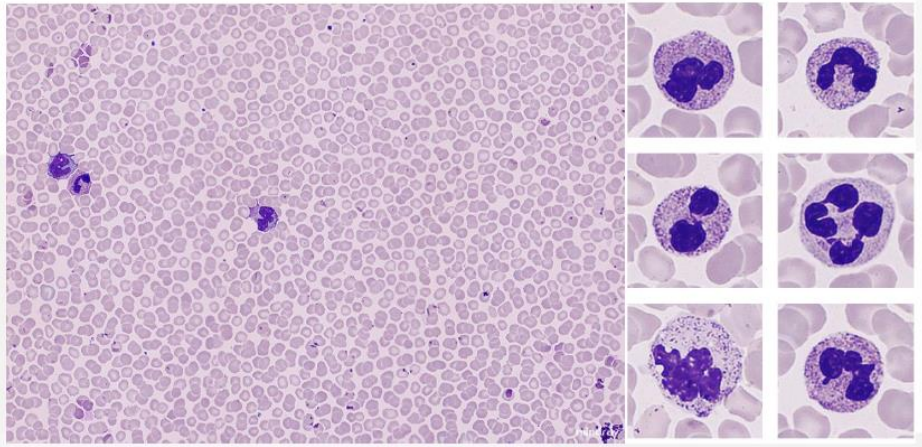
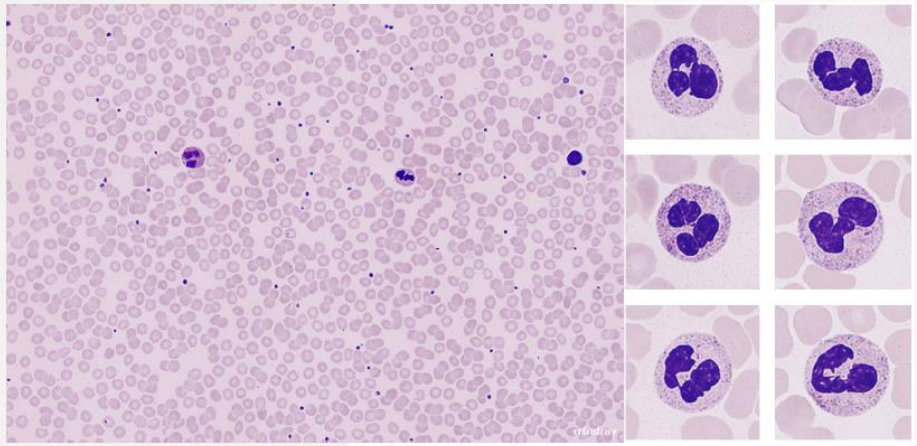


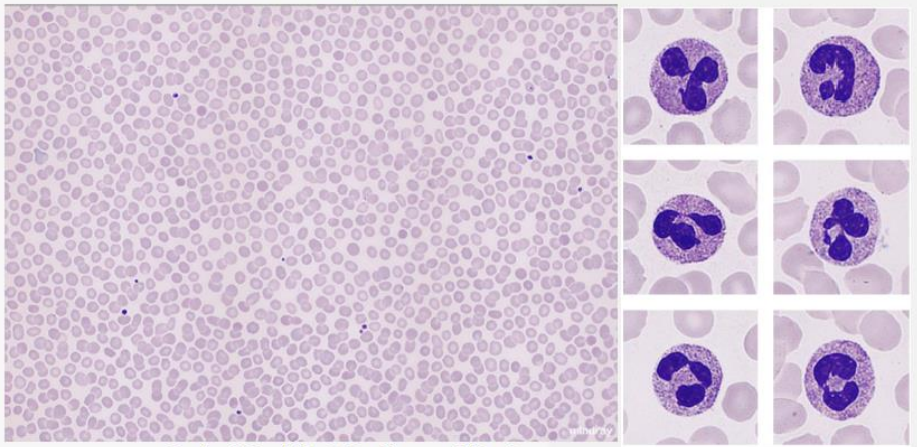
New StainA&pH7.2 Buffer；1/1+1



New StainA&pH7.2 Buffer；4/3+8.5



StainA&pH7.2 Buffer；2/3+5



StainA&pH7.2 Buffer；4/3+5

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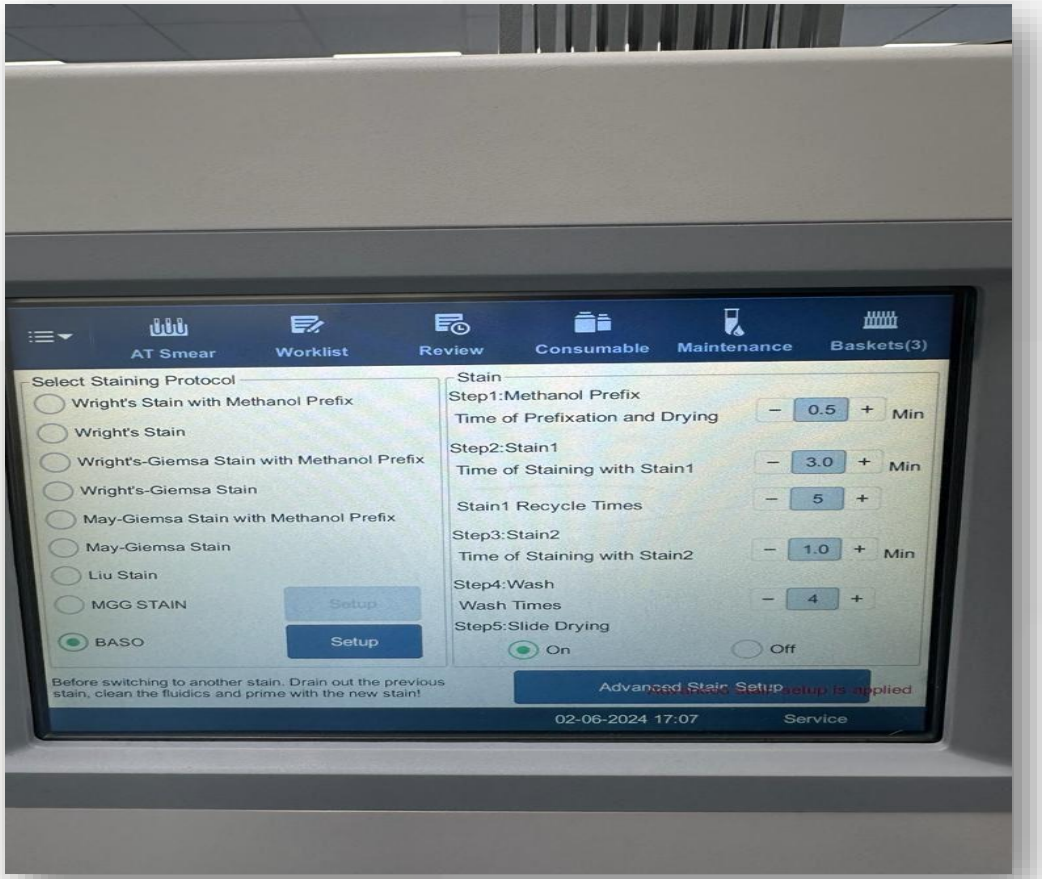
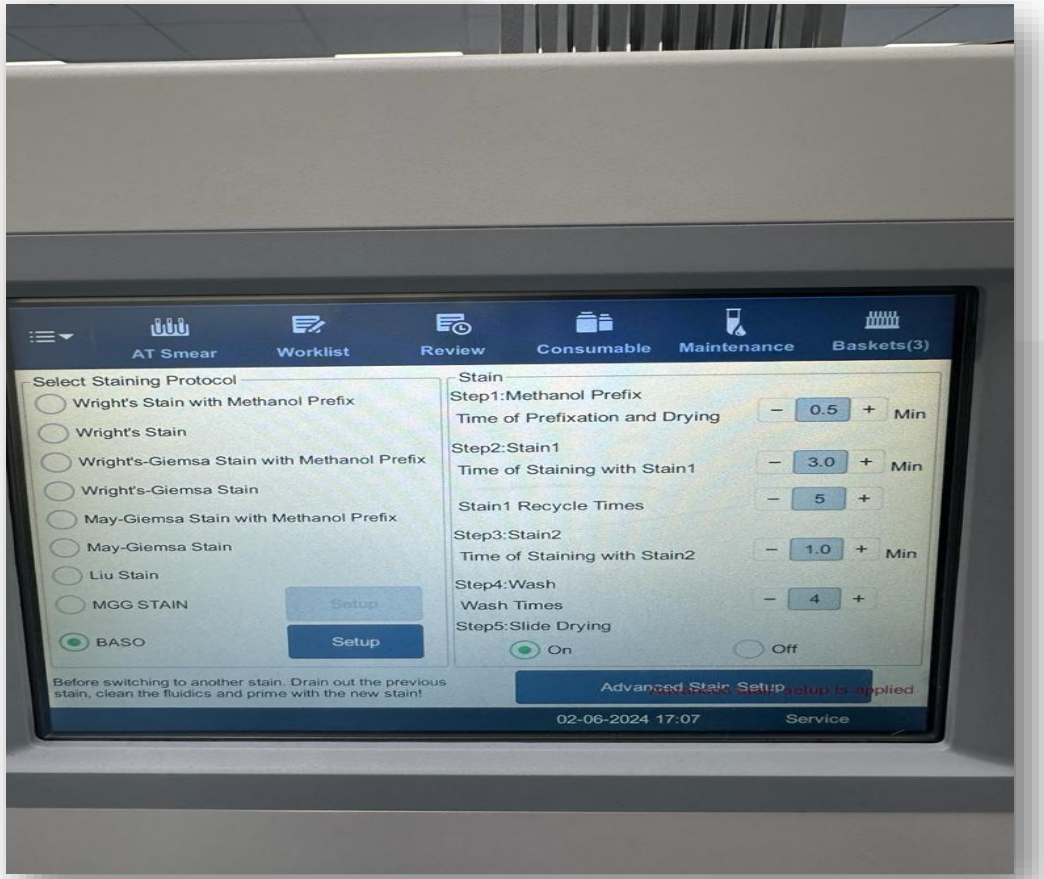
Case Solution

The final stain protocol using PH 6.8 Buffer.
Using PH 6.8 Buffer.





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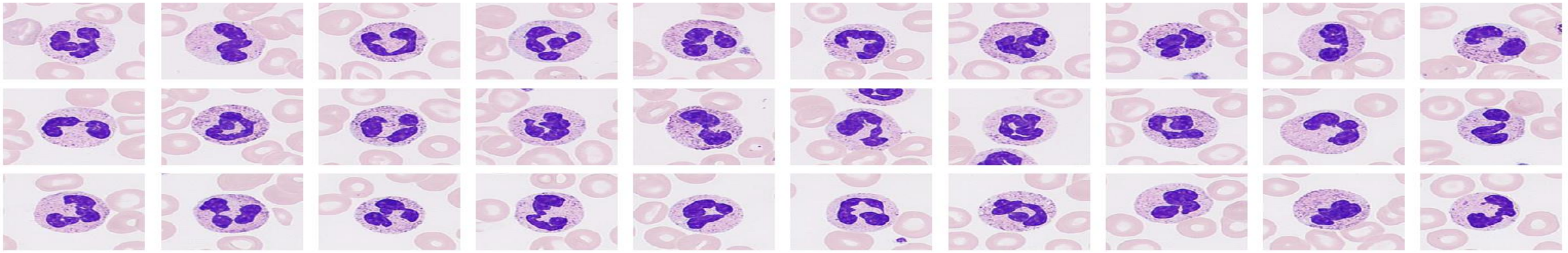
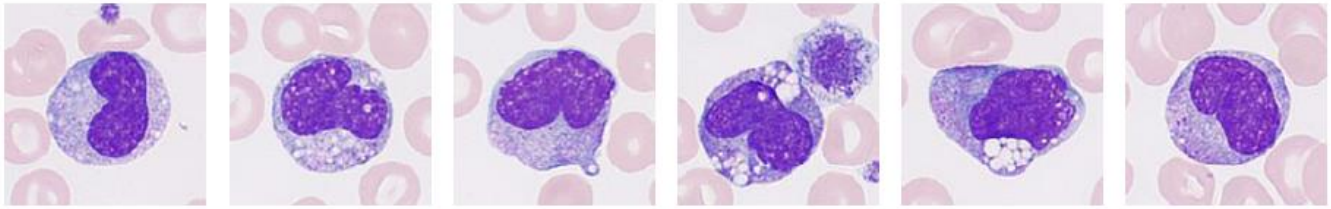
Case Solution

The final stain protocol using PH 6.8 Buffer

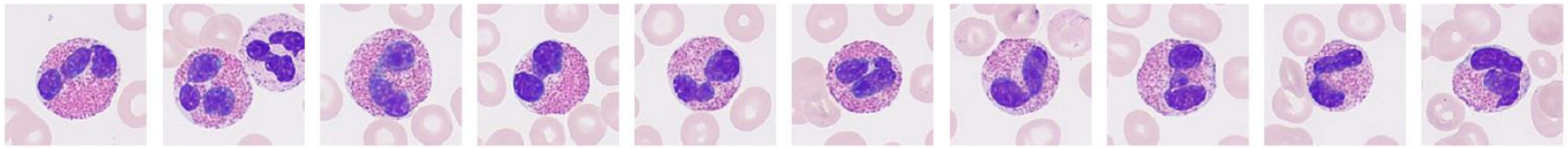
Segmented neutrophils	71	71.0%



Monocytes	6	6.0%



Eosinophils	10	10.0%



Case Solution

- **Poor nuclear quality contrast, nuclear staining too dark and lack of detail, MC80 erythrocytes are satisfactory but microscopy effect is too pale**

Root cause: colour deviation and insufficient resolution of the touch screen.

Suggested measures: Install PC' with 4K screen and guide customers to view the results on the 4K monitor.

Expected results: the overall colour effect of staining is not too dark and consistent with the microscope, the 4K screen provides more detailed information in the nucleus.

Effect: Issue solved.

Thanks!

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